

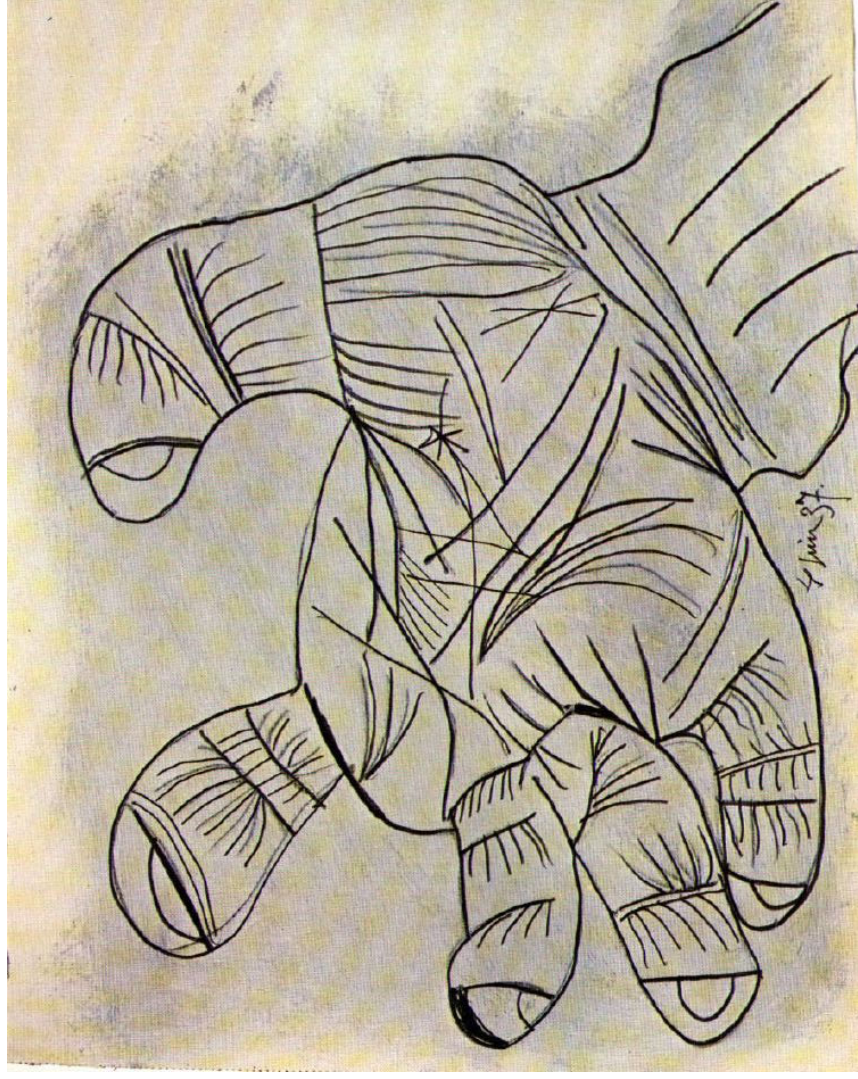
Surgical management of arthritis of small joints of the hand

Rouin Amirfeyz

Hand Fellow

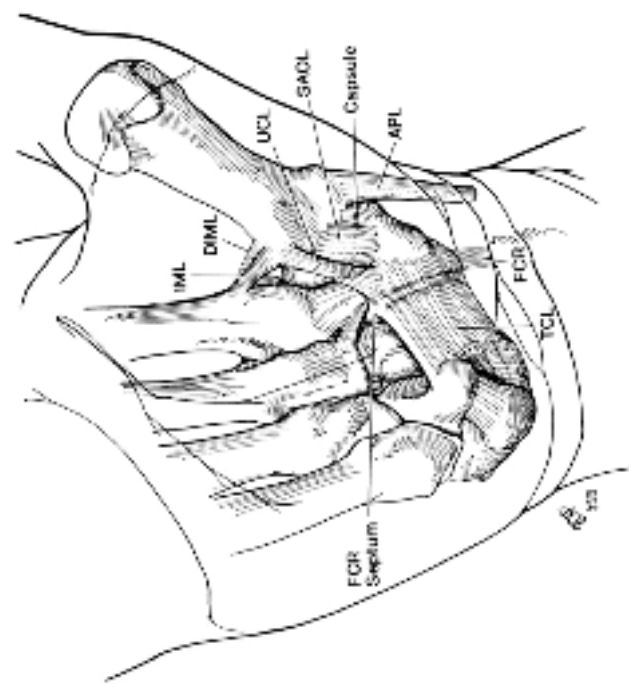
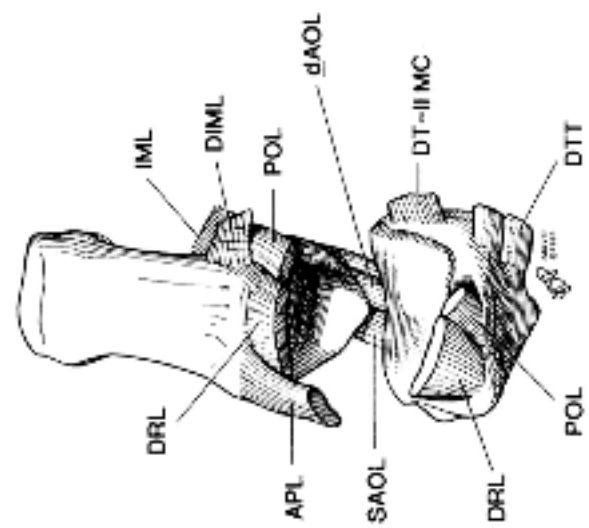
Queen's Medical Centre

Nottingham



Surgical management

- Trapeziometacarpal arthritis
- MCPJ arthritis
- PIPJ arthritis
- DIPJ arthritis



Eaton & Littler

- Stage 1: Normal radiograph / widening due to synovitis
- Stage 2: Joint space narrowing (starts palmar side)
- Stage 3: Osteophyte > 2mm
- Stage 4: Pantrapezial OA

Options

- Early stage
 - AOL reconstruction (Littler-Eaton)
 - Osteotomy
- Late stage
 - Fusion
 - Arthroplasty
 - Excision
 - Soft tissue interposition with or without excision
 - Implants

Treatment of Eaton Stage I Trapeziometacarpal Disease With Thumb Metacarpal Extension Osteotomy

Matthew M. Tomaino, MD, Pittsburgh, PA

The Journal of Hand Surgery / Vol. 25A, No. 6, November 2000



- 12 patients (age 24-51)
- Average 2 years follow up
- All osteotomies healed at 7 weeks

(Average Visual Analog Scale Scores)

	<i>Preoperative</i>	<i>Postoperative</i>
Feeling	5	2
Pain (with cold)	5	2
Pain (most times)	5	1
Use (dexterity)	6	3
Movement (flexibility)	5	2
Grip	6	3
Activities of daily living	5	3
Use at work	6	3
Appearance	4	2
Overall feeling	6	2

Ligament Reconstruction for the Painful Thumb Carpometacarpal Joint*

BY RICHARD G. EATON, M.D. †, AND J. WILLIAM LITTLER, M.D. †, NEW YORK, N.Y.

From the Hand Service, Department of Surgery, Roosevelt Hospital, New York

VOL. 85-A, NO. 8, DECEMBER 1973

J B & J S



Long-Term Results of Volar Ligament Reconstruction for Symptomatic Basal Joint Laxity

Douglas M. Freedman, MD, Richard G. Eaton, MD,
Steven Z. Glickel, MD, New York, NY

The Journal of Hand Surgery / Vol. 25A No. 2 March 2000

- 15 years average (10-23)
- 19_(24 thumbs)/31 (61%) follow-up (age 18-55)
- Painfree in 15 thumbs (62.5%)
- Advancement of OA in 8%
- No trapeziectomy

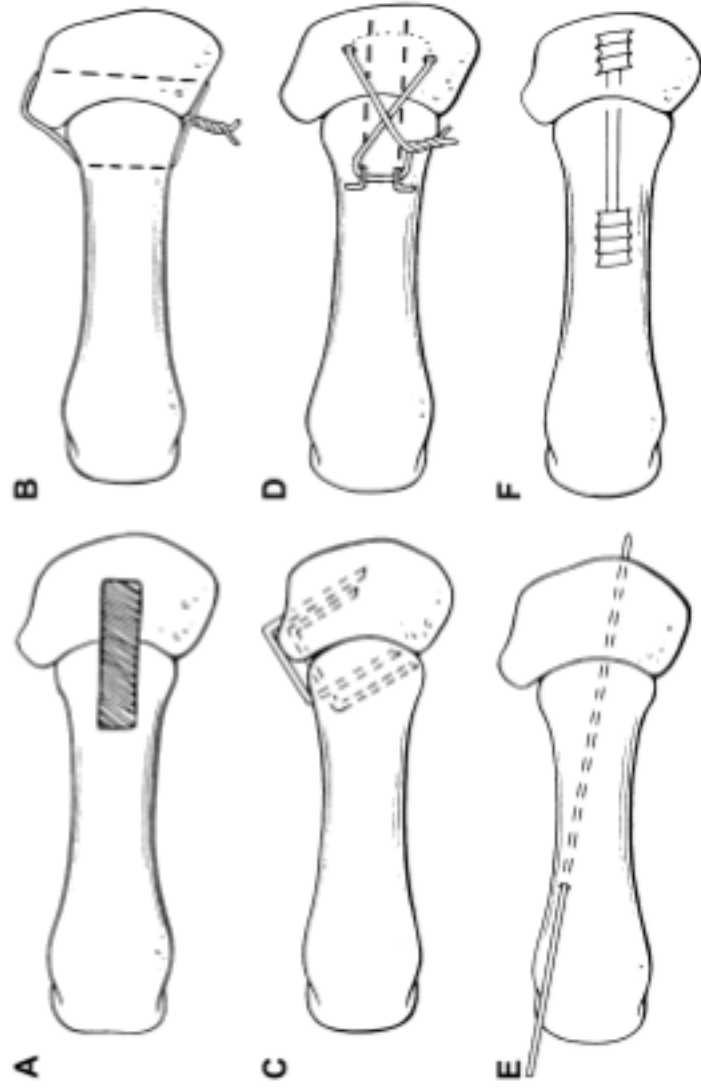
Thumb	Age at Surgery (y)	Duration of Follow-up Period (y)	Cartilage Status	Stage
1	28	10	NA	I
2	55	17	MC	III
3	22	24	NL	I
4	49	21	NA	II
5	39	13	MC	I
6	31	11	NL	II
7	29	16	MC	II
8	34	10	MC	II
9	25	17	NL	I
10	25	17	MC	II
11	27	18	MC	I
12	27	18	NA	III
13	40	10	MC	I
14	41	10	NA	I
15	49	10	MC	I
16	21	15	NA	I
17	35	11	MC	II
18	33	10	MC	I
19	33	10	MC	I
20	35	24	MC	II
21	24	15	NL	I
22	18	21	NL	I
23	41	14	MC	I
24	27	12	NA	I

NA, not available; MC, minimal change; NL, normal.

Fusion

- Best to be avoided if adjacent joints are arthritic
- ? An option in patients with generalised joint laxity
- Age limit is controversial (? acceleration of STT OA)





- Cavallazzi and Spreafico (J Hand Surg Br 1986)
 - At 10 years (42 patients):
 - 90% satisfied
 - 70% painfree
 - 56% normal pinch strength
 - No conversion to trapeziectomy!
- Up to 44% re-operation
- 8-55% nonunion rate

Trpaziektomy ± LRTI









Excision of the Trapezium for Osteoarthritis of the Trapeziometacarpal Joint: A Study of the Benefit of Ligament Reconstruction or Tendon Interposition

*Tim R. C. Davis, ChM, Nottingham, United Kingdom,
Owen Brady, MB, Derby, United Kingdom,
Joseph J. Dias, MD, Leicester, United Kingdom*

Methods

- Randomised to three groups
- 62 trapeziectomy
- 59 PL
- 62 FCR(1/2) LRTI

- All had 4/52 of k-wire stabilisation and 6/52 of splinting
- Reviewed preop, 3 & 12 months post op

1-year Pain Level	T (n = 62)	T + PL (n = 59)	T + LRTI (n = 62)
No pain or restrictions	25	18	25
Discomfort with use but no restrictions	26	28	27
Pain with use, some restrictions	4	7	4
Rest pain, no restrictions	2	1	1
Rest pain, some restrictions	0	2	4
Rest pain, severe restrictions	3	1	0
Night pain	1	2	1
Not recorded	1	0	0

No significant difference between the 3 treatment groups ($p = .4$).

1-Year Follow-Up Assessment	T (n = 62)	T + PL (n = 59)	T + LRTI (n = 62)
Subjective stiffness			
None	39	34	38
Mild	21	20	17
Moderate	1	5	7
Severe	0	0	0
Not recorded	1	0	0
Subjective weakness			
Normal	22	20	22
Mild weakness	18	25	16
Moderate weakness	16	10	16
Severe weakness	5	4	8
Not recorded	1	0	0

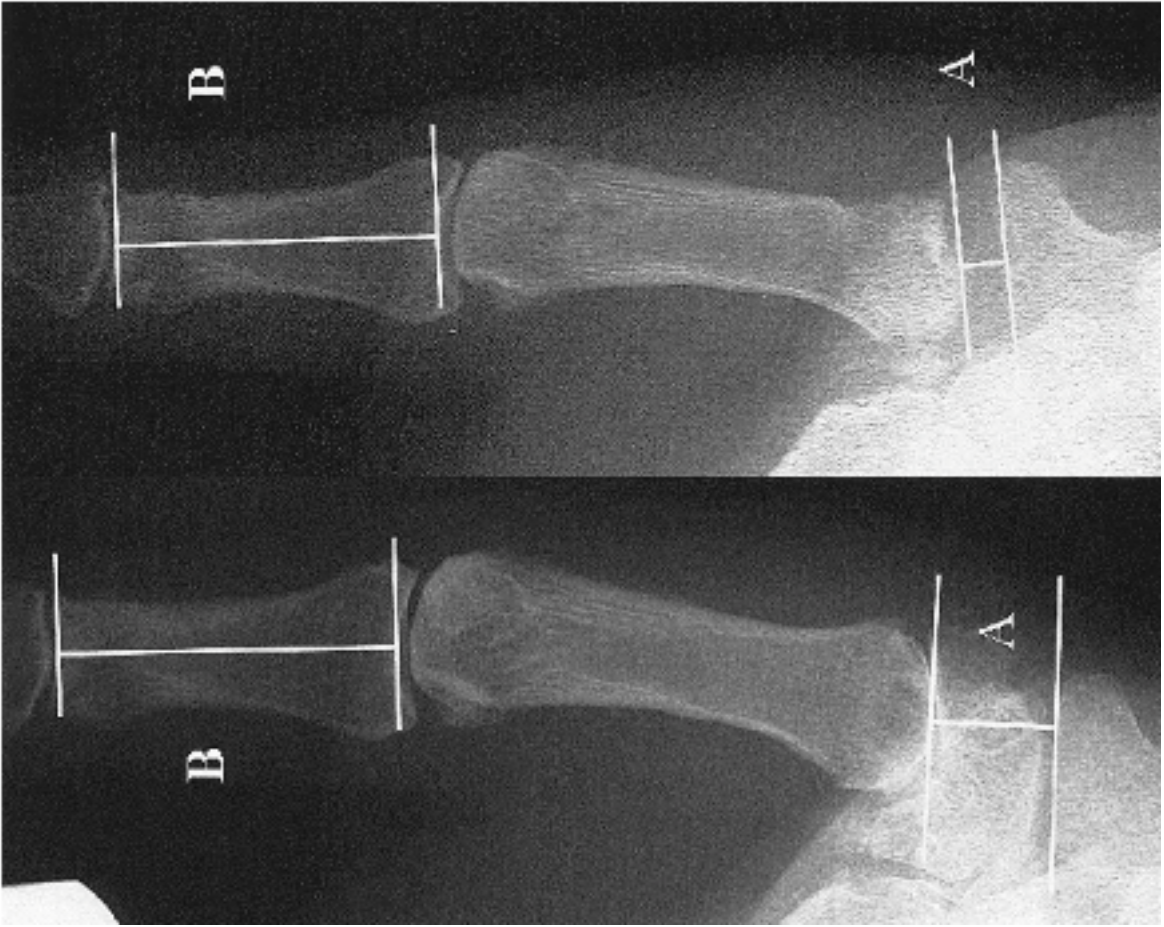
No significant difference between the 3 treatment groups for stiffness ($p = .62$) or weakness ($p = .66$).

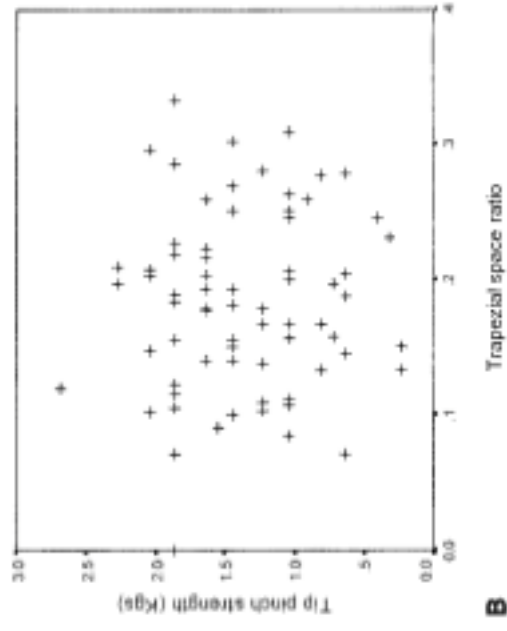
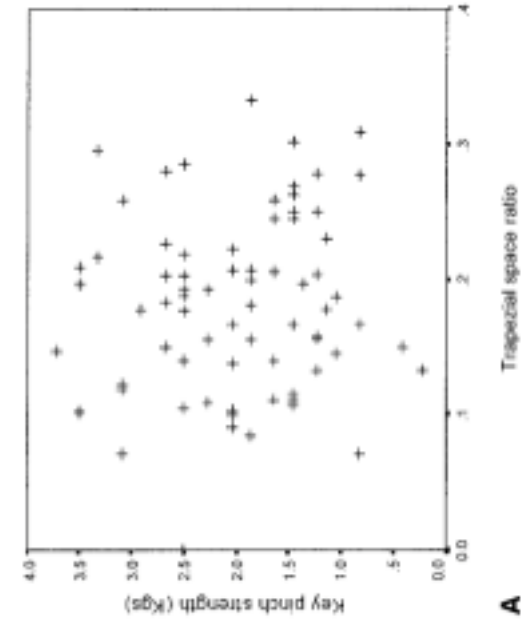
Trapeziectomy + stabilisation is
as good as LRTI

Trapezial Space Height After Trapeziectomy: Mechanism of Formation and Benefits

Nicholas D. Downing, MA, Timothy R.C. Davis, MCh,
Nottingham, England

The Journal of Hand Surgery / Vol. 26A No. 5 September 2001





TRAPEZIECTOMY FOR TRAPEZIOMETACARPAL
JOINT OSTEOARTHRITIS: IS LIGAMENT
RECONSTRUCTION AND TEMPORARY STABILISATION
OF THE PSEUDARTHROSIS WITH A KIRSCHNER
WIRE IMPORTANT?

T. R. C. DAVIS and A. PACE

From the Department of Trauma and Orthopaedics, Queens Medical Campus, Nottingham University Hospitals, Nottingham, UK

The Journal of Hand Surgery (European Volume, 2009) 34E: 3: 312-321

Randomised

- 67 Trapeziectomy vs 61 LRTI + stabilisation
- Trapeziectomy had 3 weeks soft bandage immobilisation
- LRTI group had k-wire removed 6 weeks post op
- Data from preop, 3 and 12 months

	24	21
Pain at 1-year follow-up		
No pain or restrictions	24	21
Discomfort with use, but no restrictions	30	20
Pain with use, some restrictions	6	8
Rest pain, no restrictions	1	2
Rest pain, some restrictions	3	8
Rest pain, severe restrictions	3	1
Night pain	0	1
Subjective stiffness at 1-year follow-up		
None	47	44
Mild	17	12
Severe	3	5
Subjective weakness at 1-year follow-up		
None	25	30
Mild	16	9
Moderate	20	16
Severe	6	6
PEM pain* (median and range (0-6))	(n = 50)	(n = 48)
Preop.	4 (0-6)	4 (1-6)
3 months	2 (0-6)	1 (0-5)
1 year	1 (0-4)	1 (0-6)
DASH pain* (median and range (0-4))	(n = 44)	(n = 44)
Preop.	3 (0-4)	3 (1-4)
3 months	2 (0-4)	2.5 (0-3)
1 year	1 (0-3)	1 (0-4)
DASH pain* with activity (median and range (0-4))	(n = 44)	(n = 44)
Preop.	3 (0-4)	3 (2-4)
3 months	2 (0-4)	2 (0-3)
1 year	1 (0-4)	1 (0-4)
PEM score* (mean and 95% CI)	(n = 47)	(n = 51)
Preop.	59 (55-63)	62 (59-65)
3 months	41 (36-46)	39 (33-44)
1 year	30 (25-34)	32 (27-37)
DASH score* (mean and 95% CI)	(n = 44)	(n = 46)
Preop.	65 (58-72)	65 (59-72)
3 months	52 (44-59)	42 (35-50)
1 year	34 (26-42)	37 (28-45)

*Not all patients completed every question or returned the DASH and PEM questionnaires at each of the three (preoperative, 3-month and 1-year) assessments. The data presented for the DASH and PEM scores are for the patients who completed and returned the forms at each of the three assessment times.

	<i>Trapeziectomy alone (n = 65)*</i>	<i>Trapeziectomy and LRTT (n = 57)*</i>
Operated hand		
Key pinch	Preop. 3 month 1 year	4.0 (3.4-4.6) 3.7 (3.3-4.1) 4.7 (4.2-5.2)
Tip pinch	Preop. 3 month 1 year	2.9 (2.5-3.3) 2.6 (2.2-2.9) 3.3 (3.0-3.7)
Grip strength	Preop. 3 month 1 year	16.3 (13.5-19.0) 14.9 (12.7-17.0) 21.0 (18.6-23.5)
Contralateral hand		
Key pinch (contralateral)	Preop. 3 month 1 year	6.0 (5.4-6.6) 6.4 (5.9-7.0) 5.7 (5.2-6.2)
Tip pinch (contralateral)	Preop. 3 month 1 year	3.9 (3.5-4.4) 4.1 (3.8-4.5) 3.7 (3.3-4.1)
Grip strength (contralateral)	Preop. 3 month 1 year	23.5 (20.6-26.4) 26.0 (23.4-28.6) 24.6 (21.8-27.4)

No difference between the two
groups

A COMPARISON OF FUSION, TRAPEZIECTOMY AND SILASTIC REPLACEMENT FOR THE TREATMENT OF OSTEOARTHRITIS OF THE TRAPEZIOMETACARPAL JOINT

E. J. TAYLOR, K. DESARI, J. C. D'ARCY and A. V. BONNICI

From the Orthopaedic Department, Eastbourne District General Hospital, Kings Drive, Eastbourne, East Sussex, UK

Journal of Hand Surgery (British and European Volume, 2005) 30B: 1: 45-49

<i>Eaton and Linder grade</i>	<i>Fusion</i>	<i>Excision</i>	<i>Replacement</i>
1	3	1	1
2	6	5	2
3	16	9	8
4	9	8	6
Number of films available	34	23	17

	<i>Fusion</i>	<i>Excision</i>	<i>Replacement</i>
Age (range)	64 (48-80)	63 (39-79)	66 (55-76)
Dominant hand	14	13	15
Nondominant hand	22	12	7
Male	5	4	4
Female	31	21	18
Average follow-up (months)	39	33	42

HAND FUNCTION	How well do your hands work generally?		Fusion n=25	Excision n=25	Replacement n=22
	Full use	No use			
THUMB PAIN	How much pain do you get in your thumb?				
	No pain	Terrible	14 (8-21)	26 (14-38)	18 (9-27)
SATISFACTION	What has been the effect of your thumb operation?		19 (10-28)	36 (22-49)	20 (11-30)
	Much better	Much worse	32 (22-42)	31 (18-43)	35 (25-45)
		Same	3 (2-5)	4 (2-5)	3 (1-5)

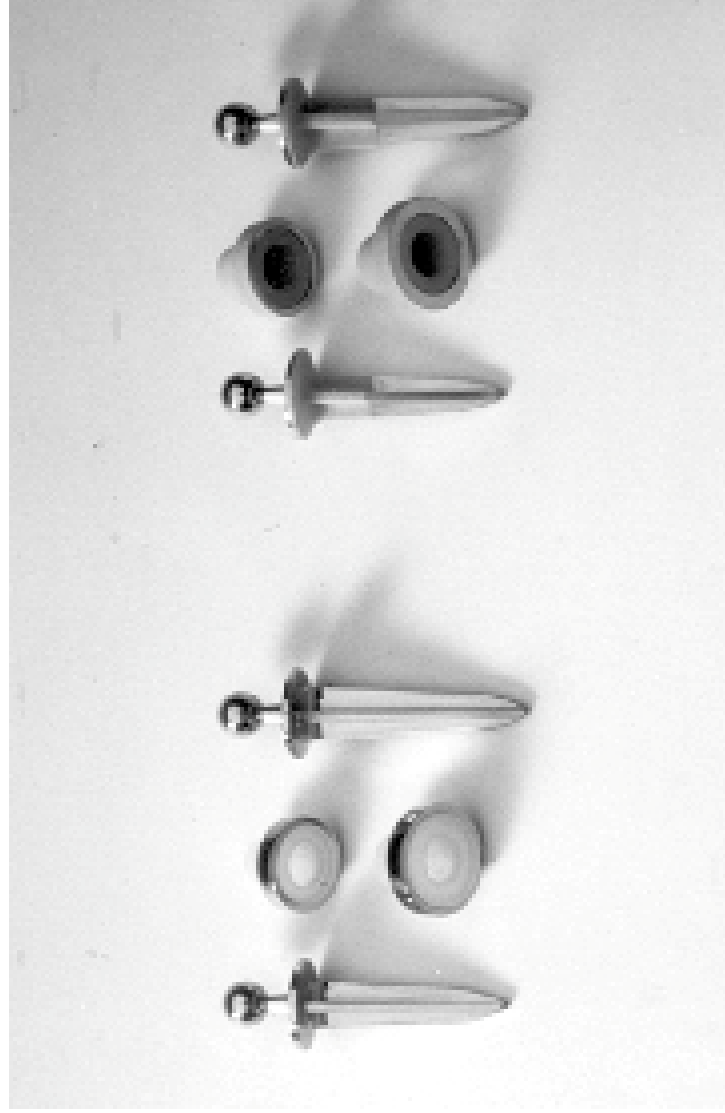
Postoperative pain level
How well do your hands work?
Effect of surgery
Activities of daily living

	Fusion n=36	Excision n=25	Replacement n=22	Significance
Abduction (deg)	57 (53-61)	57 (51-64)	60 (53-68)	Not significant
Extension (deg)	68 (63-73)	66 (57-74)	69 (61-77)	Not significant
Flexion (mm)	25 (21-30)	21 (31-64)	16 (12-20)	P = 0.01
Tip pinch (kg force)	7 (5-8)	6 (5-8)	7 (5-8)	Not significant
Key pinch (kg force)	10 (8-12)	10 (8-13)	11 (9-12)	Not significant

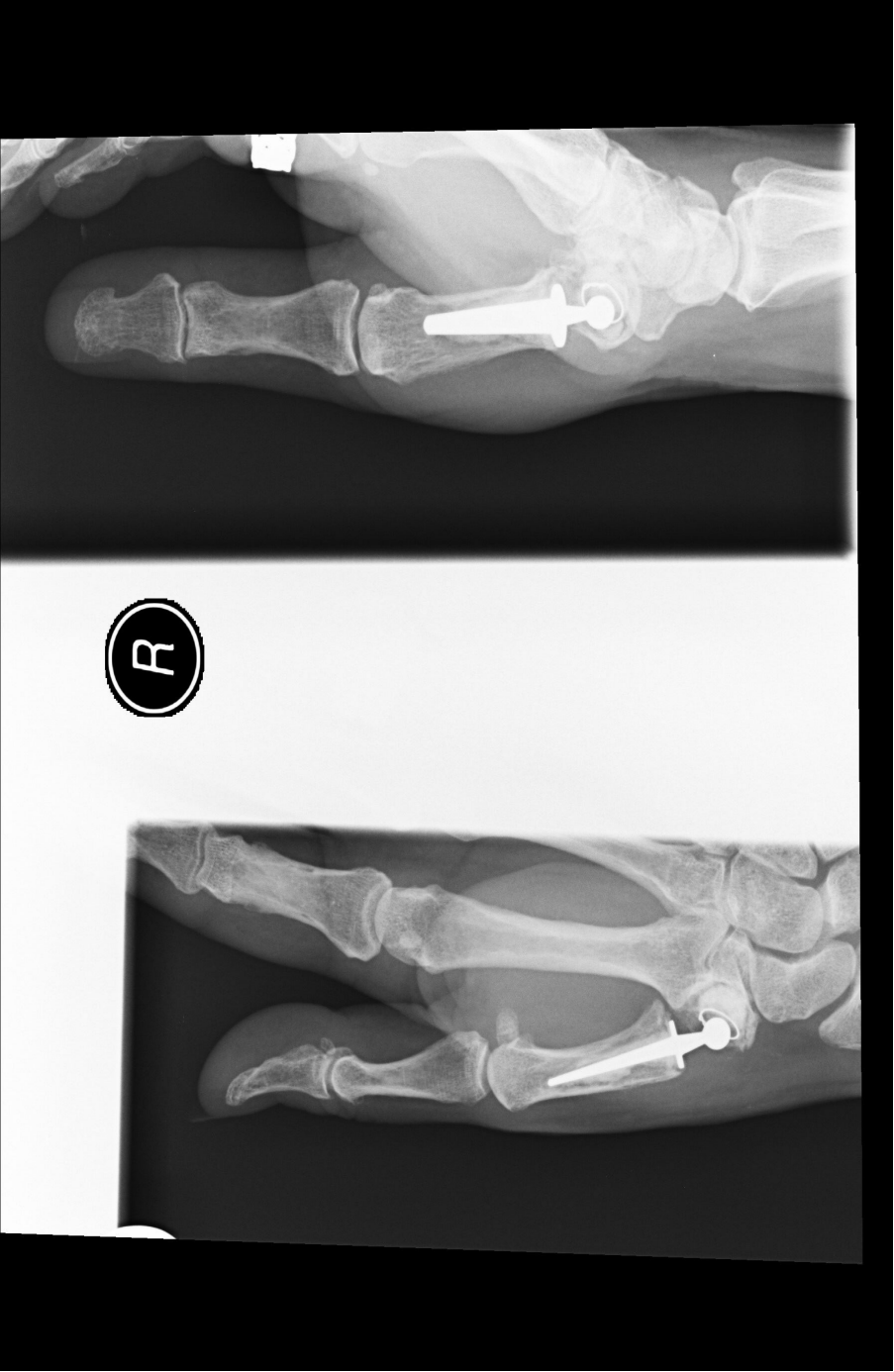
	Fusion	Excision	Replacement
Nerve damage	4	0	2
Infection	1	0	0
Reoperation	6	0	1
Revision	1	0	2

La prothèse Roseland

F. Moutet*, C. Lebrun, P. Massart, C. Sartorius



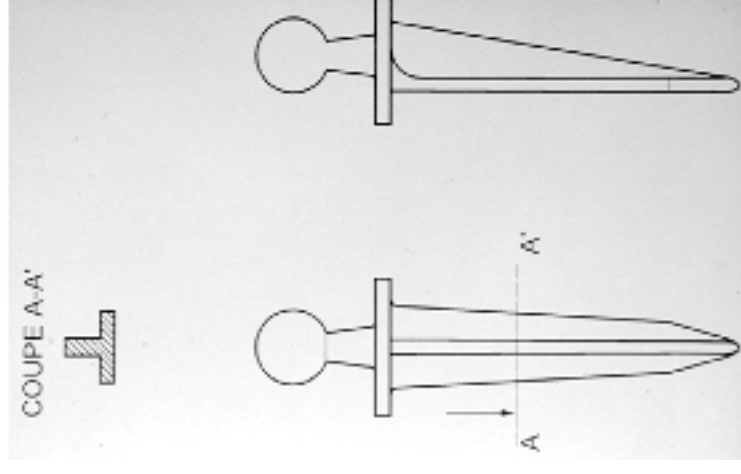




van Cappelle et al. J Hand Surg Am

1999

- 72% implant survival at 16 years
- 44% radiographic loosening
- More failures in <60s



MCPJ Arthritis

- Mainly in inflammatory arthritis (multiple joint and more severe deformities)
- Post-traumatic and primary osteoarthritis also observed
- ROM important to position digits in space
- Arthroplasty is the treatment of choice

Implants

- Hinged
- Flexible
- Third generation
 - Unconstrained
 - Hemispherical
 - Offset stem
 - Pyrocarbon

Intermediate and long-term outcomes of MCP arthroplasty

Investigation	# joints	F/U (years)	Active MCP ROM	Implant fracture
Mannerfelt et al [10]	144	2.5	40	4/144 (3%)
Beckenbaugh et al [4]	186	2.8	38	31/186 (16%)
Blair et al [6]	115	4.5	43	24/115 (21%)
Bieber et al [5]	210	5	39	0/210 (0%)
Maurer et al [11]	137	8.4	39	
Kirschenbaum et al [9]	144	8.5	44	15/144 (10%)
Wilson et al [3]	185	9.5	29	
Olsen et al [12]	60	7	30	13/60 (22%)
Hansraj et al [8]	170	5.2	27	12/170 (7%)
Schmidt et al [13]	102	10.1	35	28/102 (28%)
Goldfarb and Stern [7]	208	14.2	36	134/208 (63%)

**The Journal of
Bone and Joint Surgery**
American Volume

VOLUME 54-A, No. 3

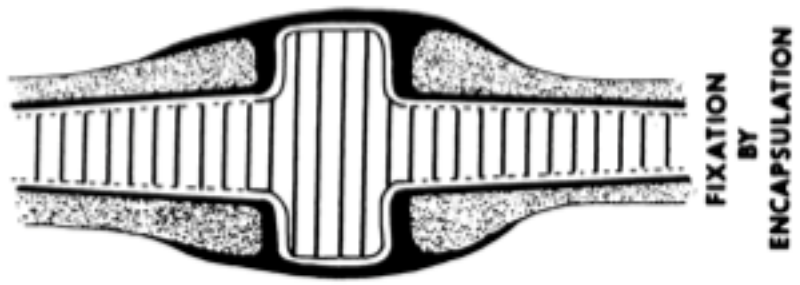
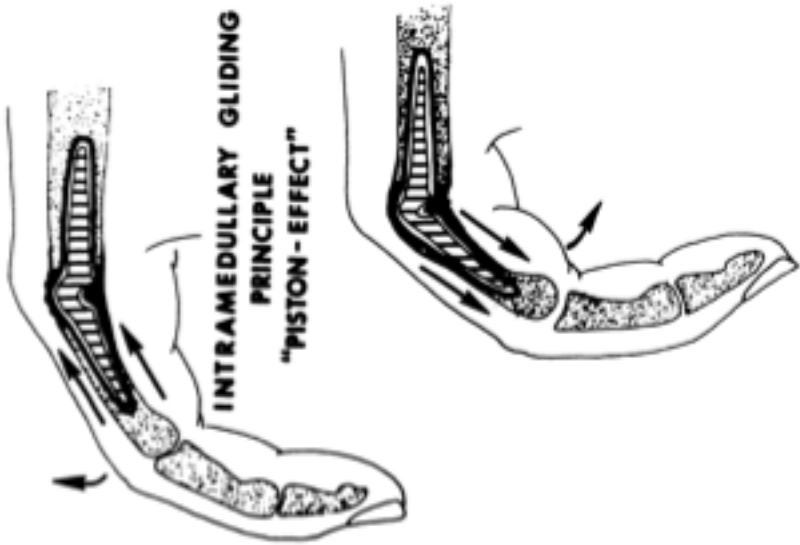
APRIL, 1972

Flexible Implant Arthroplasty for Arthritic Finger Joints

RATIONALE, TECHNIQUE, AND RESULTS OF TREATMENT^o

BY ALFRED B. SWANSON, M.D.†,
GRAND RAPIDS, MICHIGAN

From Blodgett Memorial Hospital, Grand Rapids



AVANTA VERSUS SWANSON SILICONE IMPLANTS IN THE MCP JOINT—A PROSPECTIVE, RANDOMIZED COMPARISON OF 30 PATIENTS FOLLOWED FOR 2 YEARS

K. MÖLLER, C. SOLLERMAN, M. GEJER, P. KOPYLOV and M. TÄGIL

From the Department of Hand Surgery, Sahlgrenska University Hospital/Sahlgrenska, Göteborg, Sweden, the Department of Hand Surgery, Lund University Hospital, Lund, Sweden, the Department of Orthopaedic Surgery, Capio Lundby Hospital, Göteborg, Sweden, and the Department of Radiology, Sahlgrenska University Hospital, Göteborg, Sweden

Journal of Hand Surgery (British and European Volume, 2005) 30B: 1: 8–13



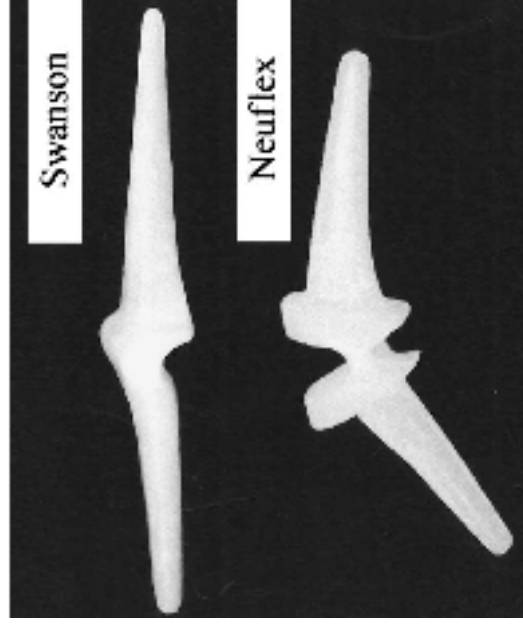
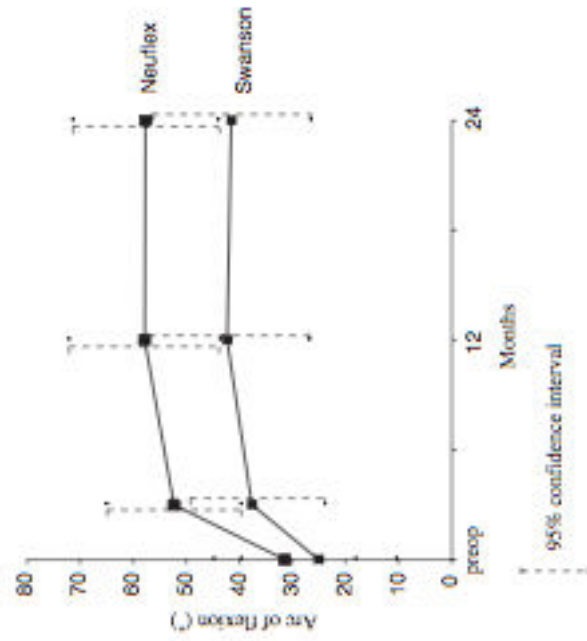
Result	Swanson		Avanta	
	Pre-op	Post-op	Pre-op	Post-op
Joint level				
ROM ¹				
Extension deficit ¹	28 (0–90)	31 (5–63)	32 (0–65)	42 (6–72)
Ulnar drift ¹	42 (–5–97)	16 (–6–50)	47 (–10–95)	19 (–15–65)
Fractures ²	33 (0–74)	10 (0–35)	30 (0–90)	13 (0–35)
	—	8	—	12

A COMPARATIVE STUDY OF OUTCOME BETWEEN THE NEUFLEX AND SWANSON METACARPOPHALANGEAL JOINT REPLACEMENTS

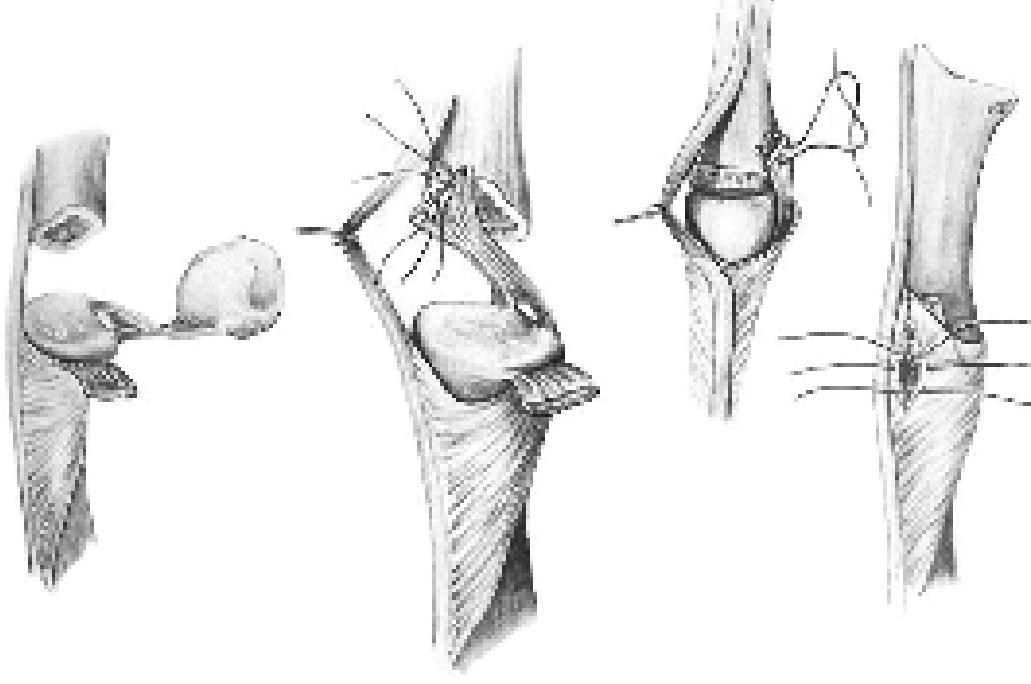
R. DELANEY, I. A. TRAIL and D. NUTTALL

From the Wrightington Hospital NHS Trust, Hall Lane, Appley Bridge, Wigan, UK

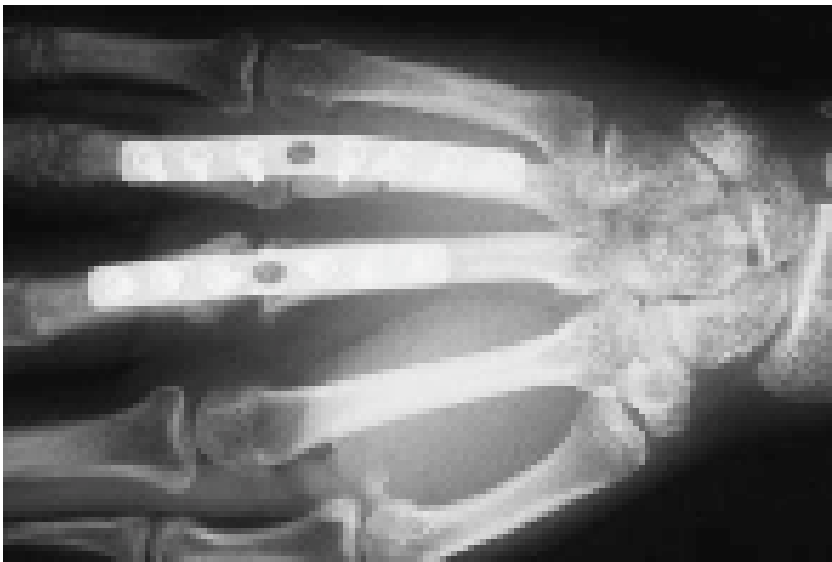
Journal of Hand Surgery (British and European Volume, 2005) 30B: 1: 3-7



- Tupper J Hand Surg Am 1989
- Oni & Davis J Hand Surg Br 1997
- 5 patients
- Median follow-up of 4 years
- 55° ROM arc









PIPJ

- Commonly involved in inflammatory arthropathy (swan-necking, Boutonniere)
- Post traumatic arthritis
- Primary osteoarthritis (Bouchard)

Impact of Simulated Proximal Interphalangeal Arthrodeses of All Fingers on Hand Function

Jessica A. Woodworth, MS, Matthew B. McCullough, BS,
Nicole M. Grosland, PhD, Brian D. Adams, MD

From the Departments of Orthopaedic Surgery and Rehabilitation and Biomedical Engineering, University of Iowa, Iowa City, IA.

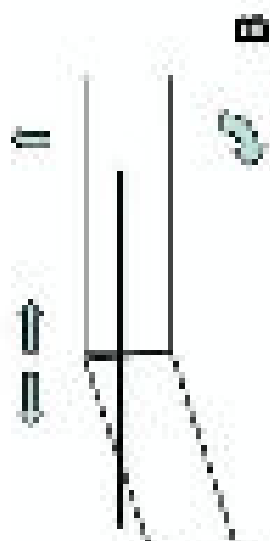
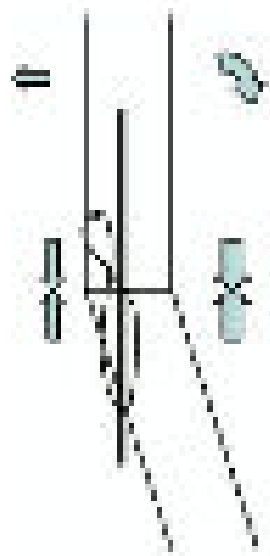
The Journal of Hand Surgery / Vol. 31A, No. 6 July–August 2006

Table 1. Average Scores for the Perceived Difficulty in Performing the Activities of Daily Living Tasks

Task	Power Grip	Precision Handling	Average Survey Score
Tying a bow		X	1.3*
Buttoning a shirt		X	0.9*
Turning a doorknob	X		0.2
Drinking from a cup	X		0.1
Opening a jar		X	0.7*
Answering a telephone		X	0.3
Pouring milk	X		0.1
Stirring rice	X		0.7*
Picking up small objects		X	1.0*
Eating soup		X	0.5*
Simulated typing		X	1.2*
Washcloth	X		0.7*
Writing		X	1.5*

Score of -1 indicates that the restricted trial was easier than the unrestricted trial, 0 indicates that the restricted and unrestricted trials were equally difficult, 1 indicates that the restricted trial was slightly more difficult, and 2 indicates that the restricted trial was much more difficult.

*Results were statistically significant.



P

P

P

P

P

P

P

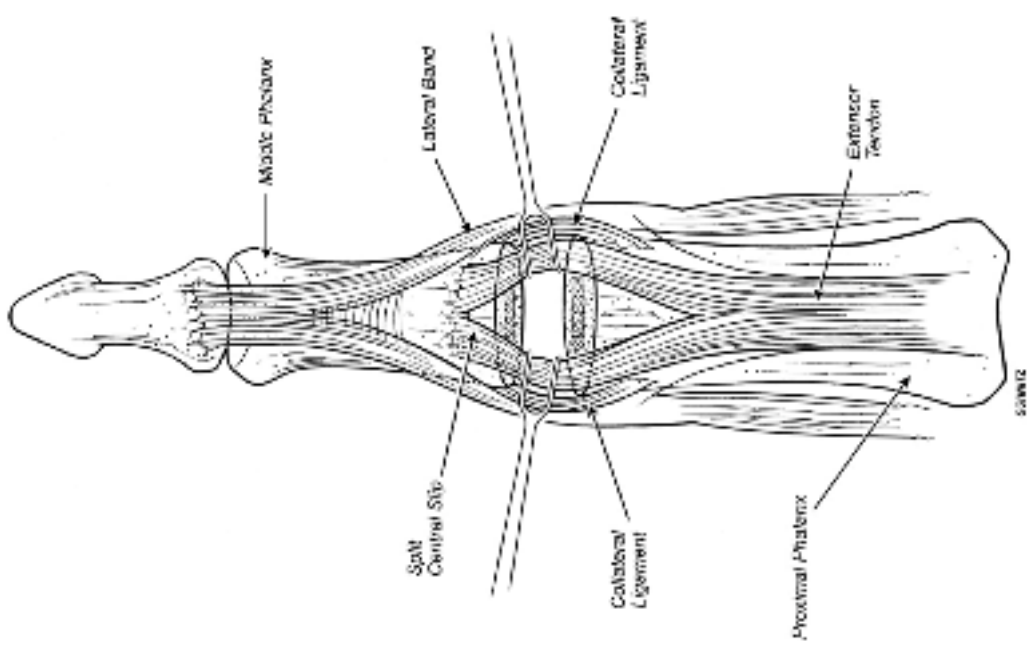
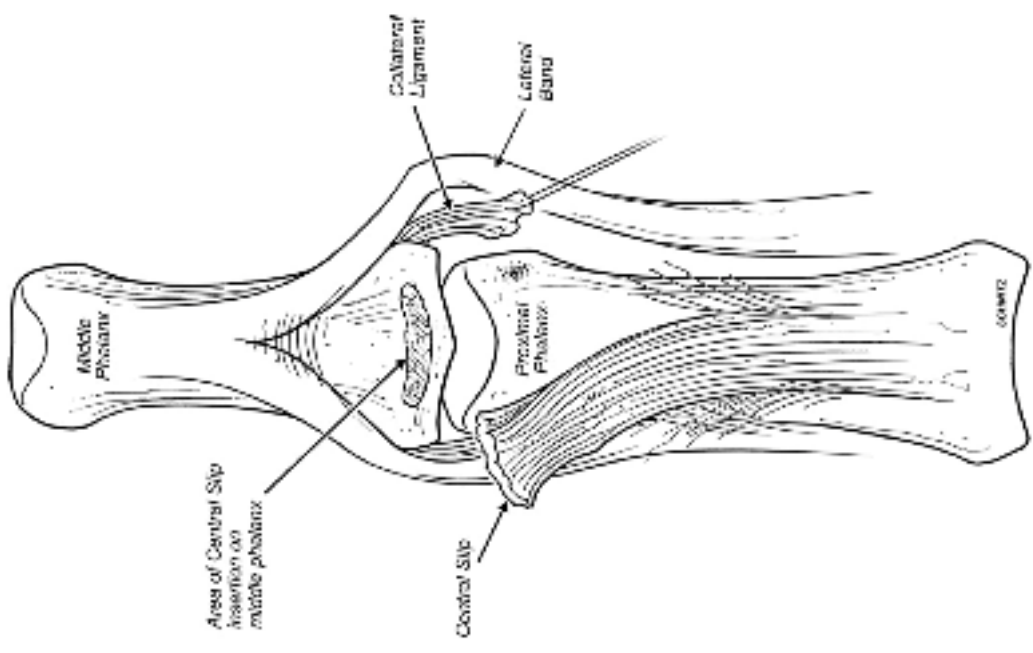
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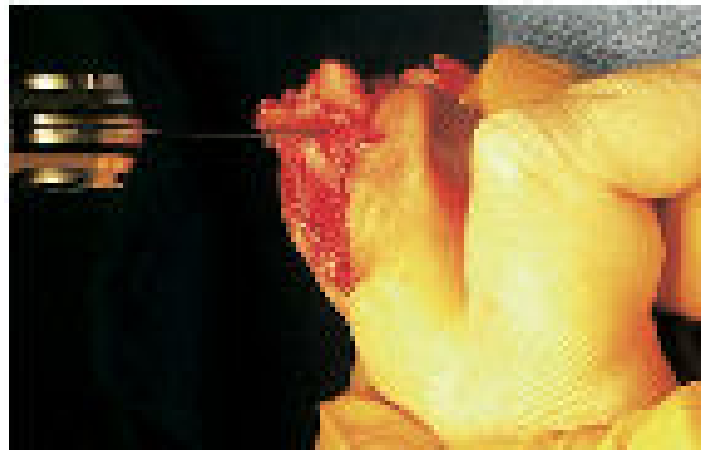
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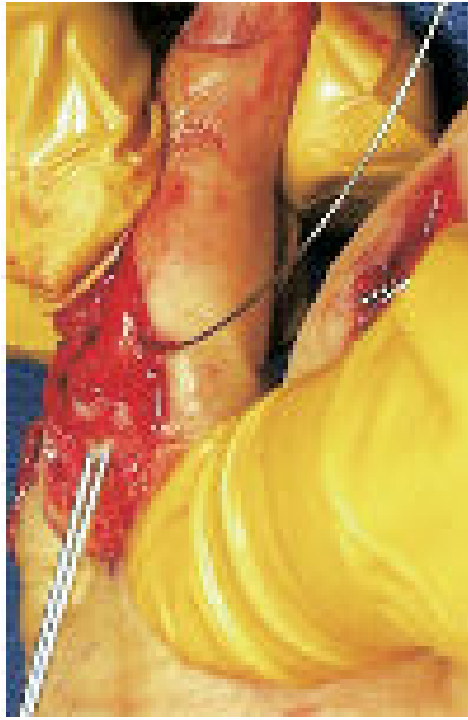
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B

A







Leibovic & Strickland

J Hand Surg Am 1994

- 224 PIPJs Retrospective
- 37 Herbert's, 100 k-wires, 69 TBW, 11 plate
- Average union 7/52 (radiographic 10/52)

Nonunion

- In 31 digits
- Highest is psoriatic, followed by RA, acute trauma, post-traumatic and nonexistence in primary OA
- Highest in k-wire group followed by TBW and Herbert screw
- All wires needed removal



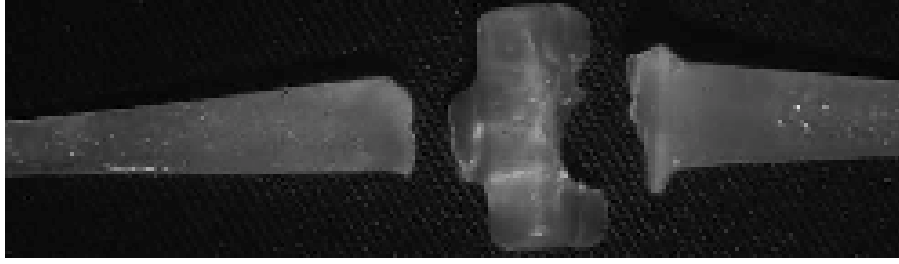
Long-Term Assessment of Swanson Implant Arthroplasty in the Proximal Interphalangeal Joint of the Hand

**Souichirou Takigawa, MD, Steve Meletiou, MD,
Michael Sauerbier, MD, William P. Cooney, MD, Rochester, MN**

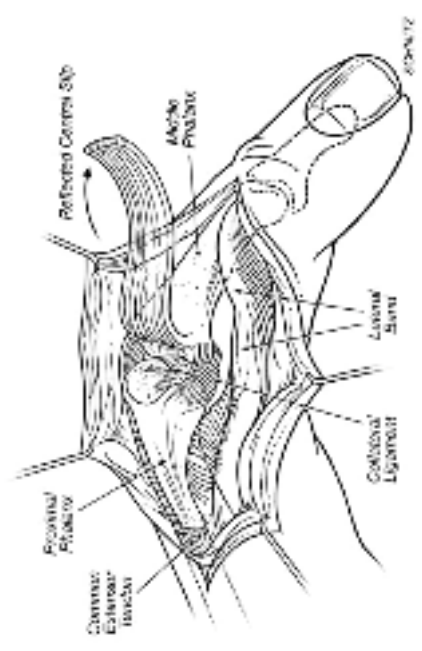
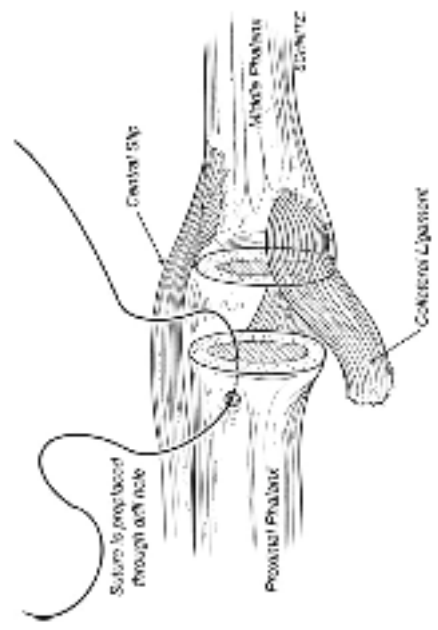
The Journal of Hand Surgery / Vol. 29A No. 5 September 2004

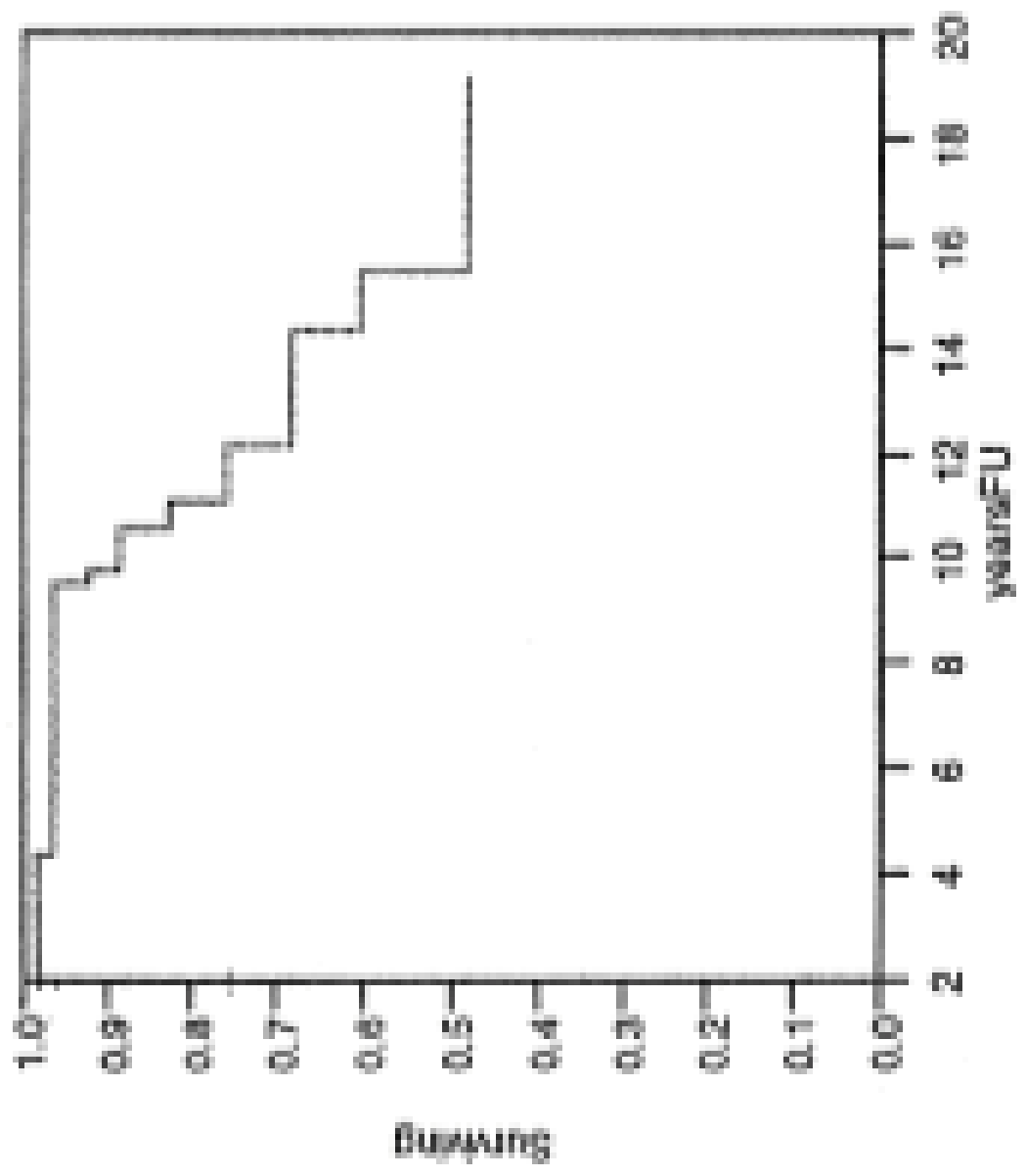
- 70 implants in 48 patients
- Follow-up 6.5 years (3-20)
- Mixed pathologies
- ROM unchanged
- Pain addressed
- Problems are swan-necking & boutonniere deformities

	Number of Joints	Follow-Up Period
DJD	70	2.1-19.2 y (mean = 6.5 y)
TA	14	2.1-12.2 y (mean = 5.5 y)
RA	11	2.2-15.5 y (mean = 7.2 y)
IA	33	2.1-19.2 y (mean = 8.0 y)
	12	3.7-10.4 y (mean = 8.2 y)



Implant fracture	11	16%
Revision	9	13%
Arthroplasty	5	
Swanson	3	
Metal-polyethylene	2	
Biomec	1	
Fusion	1	
Disarticulation	1	
Dislocation, subluxation, instability	4	6%
Infection	1	1%
Particulate synovitis	0	0%
Lymphadenopathy	0	0%









Pyrolytic Carbon Proximal Interphalangeal Joint Resurfacing Arthroplasty

Harrison G. Tuttle, MD, Peter J. Stern, MD

From the Mary S. Stern Hand Foundation and the Department of Orthopaedic Surgery, University of Cincinnati College of Medicine, Cincinnati, OH.

The Journal of Hand Surgery / Vol. 31A, No. 6, July–August 2006



- 18 PIPJs
- Retrospective
- 13 months follow-up



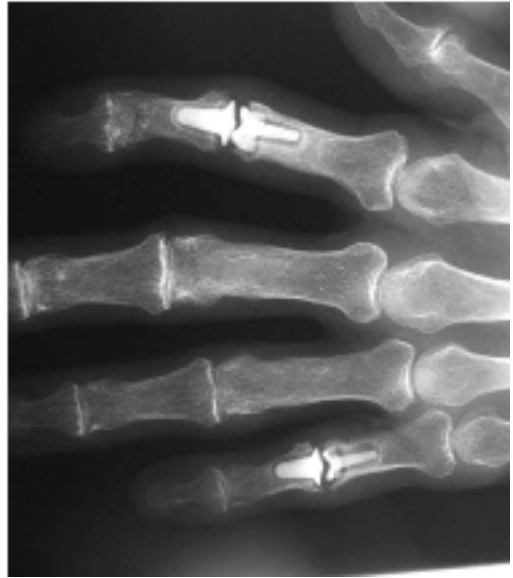
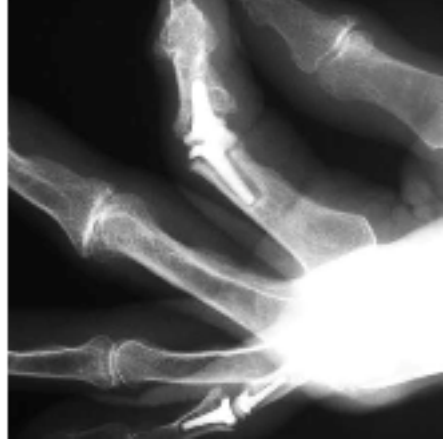
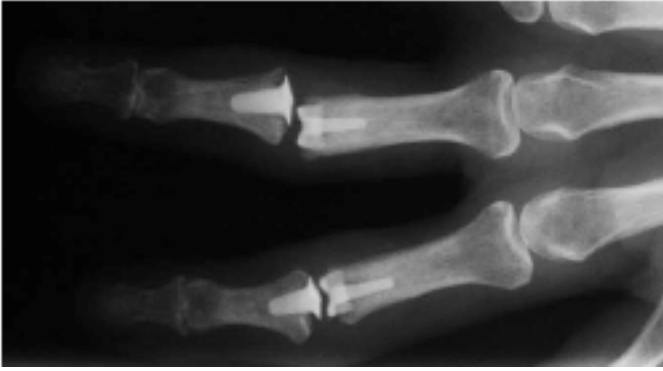
Table 2. Range of Motion

Joint	Average Preoperative ROM Ext/flex in Degrees	Average Preoperative Arc (\pm SD)	Average Postoperative ROM Ext/flex in Degrees	Average Postoperative Arc (\pm SD)	Change in ROM
Metacarpophalangeal joint	0/90	90° (8°)	0/90	90° (15°)	No change
PIPJ	10/63	53° (25°)	18/71	53° (27°)	No change
Distal interphalangeal joint	7/34	27° (26°)	17/31	14° (30°)	-13°

Active range of motion equaled passive range of motion.

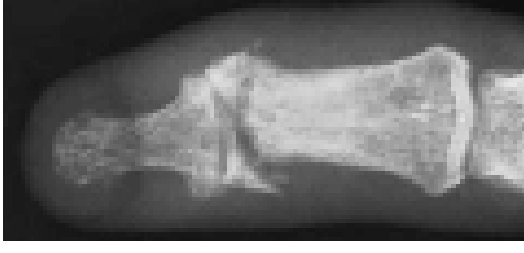
Table 3. Complications

Complication	n
Squeaking	8
Contracture	5
Deformity	4
Dislocations	2
Loosening	2
Intraoperative fix	2
Wound healing	1
Infection	0
Revision surgery	0
Total	24

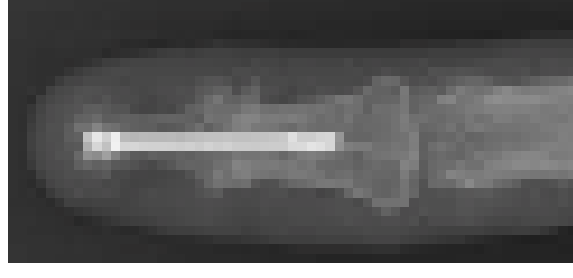
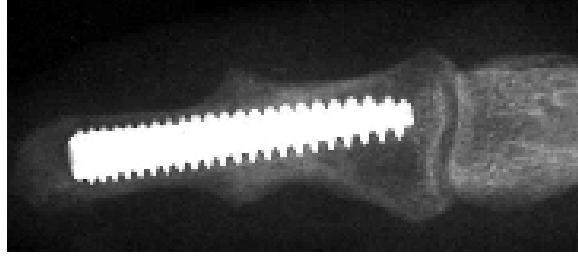


DIPJ

- Most commonly in primary OA
- Also affected by inflammatory arthritis
- Most common joint affected by OA in hand
- Arthrodesis is the mainstay of treatment
- Arthroplasty with silicone spacer is also available



- Y or H shape dorsal incision to protect germinal matrix
- Terminal tendon is incised
- Collaterals incised
- Joint dislocated
- Bone surfaces prepared using a saw
- Fixation with k-wires or a headless cannulated differential pitch screw



Stern & Fulton

J Hand Surg Am 1992

- 181 DIPJ arthrodesis (37 thumb IPJs)
- Nonunion was equal between different techniques (crossed vs longitudinal vs Herbert screw)
- 21 nonunions of which 13 were asymptomatic
- 16% had other complications like prominent metal work, cold intolerance, stiff PIPJs, dorsal skin necrosis

Use of a Headless Compressive Screw for Distal Interphalangeal Joint Arthrodesis in Digits: Clinical Outcome and Review of Complications

**Jean-Paul Brutus, MD, Andrew K. Palmer, MD, John F. Mosher, MD,
Brian J. Harley, MD, Jon B. Loftus, MD**

*From the Division of Plastic Surgery, Hôpital Notre Dame du CHUM, Montreal, Quebec, Canada; and the
Department of Orthopedic Surgery, Division of Hand Surgery, Upstate Medical University, Syracuse, NY.*

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- 27 digits (minimum 3 months follow-up)
- 4 nonunions (2 due to infection)
- 3 nail deformities (mainly in small finger)

